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CURRENT LITERATURE

BOOK REVIEWS

The living cycads

In a recent volume of the "University of Chicago Science Series" CHAMBERLAIN¹ presents in untechnical language some of the results of his 15 years of study on cycads. This group of 9 genera has several advantages from the point of view of popular treatment, and of these the writer makes good use. It may safely be said that no one is so well fitted as the author to deal with this subject, because he approaches the task not only as an expert student of the group, but also as one who knows the cycads as living plants, on account of his extended travel in regions where cycads occur. The title of the book was selected, so the author tells us, to contrast with WIELAND'S *The fossil cycads*.

The account is divided into 3 sections, part I dealing with the collecting of the material, part II with the life history, and part III with the evolution and phylogeny of the group. The first part recounts the author's journeyings in the 3 cycad regions, tropical America, Australia, and South Africa, but is much more than a narrative, for it includes important observations taken in the field which help to clear up certain disputed points. This part is rendered attractive by the author's excellent photographs of field specimens as well as by his graphic style, and will probably be the most interesting section to the non-botanical reader. The section on life history includes a short chapter on vegetative structures, in which the vascular tissues receive scant attention. The very significant anatomical features were probably considered too technical for presentation to a general audience. The sporogenous and gametophytic structures, which have attracted so much attention to the group, are clearly described and figured, and are compared with the corresponding structures of ferns. It is in this part of the book that the author's particular contribution to our knowledge of cycads comes out conspicuously. One realizes how many gaps in the story have been filled during the past decade. Part III, the shortest in the book, passes on from fact to speculation, and brings the ferns and fossil cycads into relation with the living cycads. Especially satisfying is the account of the evolution of the cone, which presents a remarkable series even in living genera. The point of view throughout this section is a conservative one, as is evinced by the treatment of Bennettitales and their relationships.

¹ CHAMBERLAIN, CHARLES J., *The living cycads*. 8vo, pp. xiv+172. figs. 91. The University of Chicago Press. 1919.

Botanists will be glad to have the author's assurance that a more extended and technical account of the living cycads is in preparation. In the present pocket volume of 172 pages the author has done a useful piece of work and has done it well.—M. A. CHRYSLER.

NOTES FOR STUDENTS

Inheritance in *Pediastrum*.—Practically all of our present knowledge of inheritance in the plant kingdom is based upon work done with flowering plants, regularly involving the sex act. The sex act in flowering plants, furthermore, is peculiarly obscured; we cannot be altogether certain what happens between the time of pollination and seed germination. We think that the program followed is a remarkably regular one, but we feel that frequently irregularities may occur, and we know that sometimes they do. We wish therefore to know what all of these irregularities are, how they affect inheritance, and how they may be induced or controlled artificially. It has long been felt that a study of inheritance in simple plants would be suggestive, for in them many of the complexities surrounding reproduction are stripped away. The sex act takes place "in the open," so that there is more hope of absolute control; some forms even lie "below the level of sex," furnishing unusual material for "pure line" work; and germ plasm seems identical with body plasm. The direct bearing of such a study upon practical genetics may be negligible, but upon theoretical genetics it promises to be profound.

HARPER² has been working with cultures of *Pediastrum*, and has developed some very significant ideas. He considers 3 "degrees of directness" of inheritance in *Pediastrum*: (1) direct transmission, as by division of plastids; (2) the more indirect transmission of those adult cell characters (as cell form) which are not visibly present as such in the germ cell; (3) the entirely indirect transmission of the characters of the many-celled organism as a whole (as colony form). The adult cell characters which HARPER observed "do not suggest the working out of influences emanating from elements in the chromosomal organization of the nucleus, but rather the direct expression of the organization of the cell as a whole when it begins to grow," involving specific polarities, surface tension, etc. These cell characters come into expression whether or not the colony is successfully formed. Colony characters, therefore, are dependent upon individual cell characters, rather than the reverse. "If in the swarming period the cell does not achieve its normal position . . . the maladjustment is never overcome."

Thus the author paints for us two distinct pictures, which should be considered separately. First, the picture of inheritance through specific polarities, etc., of protoplasts as a whole, rather than determiners located on

² HARPER, R. A., Organization, reproduction, and inheritance in *Pediastrum*. Proc. Amer. Phil. Soc. 66:375-439. pls. 5, 6. figs. 54. 1918.